Frontier Markets, the Pre-Emerging Markets of Africa

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ABSTRACT

THIS THESIS PROVIDES AN INITIAL INVESTIGATION OF THE EMERGING EQUITY MARKETS AND THE FRONTIER MARKETS IN AFRICA. AN INVESTOR LOOKING TO IMPROVE THE RISK-REWARD BENEFITS OF THEIR PORTFOLIO OUGHT TO INCLUDE THESE SHARES IN A SHARE PORTFOLIO AS EVIDENCED BY THE RESULTS OF THIS THESIS. THIS THESIS SEEKS TO PROVIDE A BRIDGE FOR THE GAP LEFT IN THE ANALYSIS OF AFRICAN MARKETS THROUGH PROVIDING ANSWERS FOR WHETHER AFRICAN EQUITIES PROVIDE THE SO CALLED DIVERSIFICATION EFFECT AND PROVIDE AN INVESTOR WITH HIGHER RETURNS GIVEN THE RISKINESS OF THESE MARKETS.

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CHAPTER 1: INTRODUCTION

1.1. Introduction

This chapter introduces the thesis and presents the research problem and research objective. Section 1.2 covers the context of the study. Section 1.3 presents gaps in the literature Section 1.4 states the research problem. Section 1.5 presents the research objectives and hypothesis. Section 1.6 presents the research questions. Section 1.7 presents the structure of the thesis and section 1.8 draws the conclusion of the chapter.

1.2. Context of Study

In the recent past, international investors have increased emerging markets in their portfolios (Bekaert and Harvey 2002). The increase in emerging markets is said to increase the returns for investors while spreading and decreasing the risk of an investor's portfolio. The financial system plays an important role in society, as it is a means in which funds are channelled from surplus entities to deficit entities and thus are crucial to the allocation of resources in a modern economy (Franklin and Gale 2001). Financial systems are developed to allocate investment funds among firms and individuals, allow inter-temporal smoothing of consumption by households and expenditures by firms and, enable households and firms to share risks. Starkey (2010) wrote that the need for a financial system stems from the fact that there exist costs associated with the acquisition of information, the making of transactions and the enforcement of contracts. Hence, financial systems arise in order to minimise the problems of information asymmetry, enforcement of contracts and transactions costs. Levine (2005), Aziakpono (2006), as well as Starkey (2010) concur that financial systems foster economic growth by mobilising and pooling of savings from a large number of individuals. This is done by acquiring and processing of information about enterprises and possible investment projects, thus allocating savings to their most productive use, by easing in the exchange of goods and services through the provision of payment services, by diversification, increasing of liquidity and the reduction of inter-temporal risk, and by monitoring of investment and carrying out of corporate governance. Financial systems can further be divided into two; Financial

Intermediaries and other Financial Institutions. Financial Institutions are further divided into the banking system and the financial market systems. The financial market system includes the stock market and bond market. This paper focuses on the stock market system and on Africa in particular. The stock market has a role in the economic growth of economies. Boubakari and Jin 2010 suggest that stock market liquidity helps in the improvement of the future economy in the long-run. Classens (1995) states that the role of stock markets are to raise capital to enable investors to diversify their wealth across a variety of assets usually more easily than in most other financial markets. Thus capital markets reduce the risk an investor must bear, reducing the risk premium demanded and the cost of capital; thirdly stock markets can perform a screening and monitoring role.

As the world's economies grapple with the aftermath of the 2008 financial crisis and struggle with sluggish growth, investors are on the hunt for the next big thing and 'safe havens' in which to place investments. Africa has been eyed as the next frontier after the boom experienced in Asia mainly due to largely growing economies, improving infrastructure, increased output and positive growth. According to the International Monetary Fund (IMF), Sub-Saharan Africa is forecast to grow at 5.6% in 2013 and 5.9% in 2014 in comparison to the United States where growth is forecast at 1.9% in 2013 and at 2.8% in 2014.

An emerging market is defined as a developing economy with stock markets in the early phases of economic and stock market development that mimics that of industrialised countries. Emerging markets have been the focus of much research over the last 30+years. Biekpe (2003), Adjasi (2006, 2007), Bekaert (1995) and Harvey (1995) have provided the academic work with information on market segmentation and integration, financial liberalisation, contagion, and much more. Nellor (2008) and Bekaert and Harvey (2002) have attributed this increase in emerging market research to the fact that emerging markets make up most of the world's population and land. Bekaert and Harvey (1997), as well as Harvey (1995) found that emerging markets have higher sample average returns than developed markets. They also found that these markets tend to show higher volatility than that of developed markets thus showing the compensation for risk is made through higher returns. The development of the African economy has been central to many African government policies. Starkey (2010) states that financial systems (i.e. banking systems and stock markets) can

influence economic growth by performing the five key financial functions, namely; mobilising savings, allocating capital, easing of exchange, monitoring and exerting corporate governance, as well as ameliorating risk. The level of development of the financial system is a key determinant of how effectively and efficiently these functions are performed. Studies such as Levine (2005), Schumpeter (1932), Goldsmith (1969), McKinnon (1973), Shaw (1973) Demirguc-Kunt and Levine (1996) investigated the extent of this relationship between the financial system and economic growth (also known as the finance-growth relationship) and acknowledge the relationship thereof. Goldsmith (1969) went further in stating that there was a diverse range of financial systems in existence. Schumpeter (1932) and Goldsmith (1969) brought about the importance of financial system development. Further studies (e.g. Demirguc-Kunt and Levine, 1996; Levine, 1997; Thakor, 1996) have dug more into the relationship and have looked closely at causality. Although literature has been mixed and inconclusive, the analysis of the relationship has brought about four schools of thought on both the existence of the relationship and the direction of causality. These schools of thought are the supply leading view, the demand following view, the bilateral relationship and the no-relationship view. The main conclusion from these schools of thought is that broadly, a well-functioning stock market system allows for the lowering in the costs of mobilising financial resources and allocating these resources to good use. Although this study does not attempt to look at this relationship per se, the finance-growth relationship is important and mentioned in this paper as it explains one of the motivations for government, policy makers and academics' interest in the development and management of financial systems.

On the other hand, frontier markets or pre-emerging markets are a sub-set of emerging markets. These markets represent countries that are investable but have less capitalisation (size) and liquidity than ordinary emerging markets. Du Toit D. et al (2010) found that frontier markets provided international investors with the benefits emerging markets offered investors from the 1980's. This would mainly be in the form of, relatively low correlation with developed and emerging markets. Low correlation offers diversification benefits to investors, and thus higher returns. The higher returns are also due to economic development in the said countries. Frontier markets currently offer high levels of growth in comparison to traditional emerging markets and developed markets.

The African continent, in particular Sub Saharan Africa has seen a surge in the increase of stock markets on the continent, both in terms of number of exchanges and market capitalisation on the exchanges. This increase however, is minimal in comparison to that of the developed world. African stock exchanges remain the most illiquid and densely capitalised in the world, and the reason for this is still under investigation. South Africa's Johannesburg Stock Exchange is the 14th largest exchange in the world (by market capitalisation) and tends to receive the highest level of funds allocated for the developing world. The question as to why Africa, outside of South Africa[1], still receives the least amount of equity investment allocated to developing nations has been topical among various academics, policy makers and the public alike. With the exception of a handful of investors who have seen the benefits of investing in Africa, international perception on Africa (which has led to this 'market failure') is that (1) African investments are riskier than other investments, (2) Africa is politically, economically, regulatory and structurally unstable and (3) no investment opportunities exist in Africa.

In modern portfolio theory, it is generally accepted that investors require a larger expected return from an asset with a higher risk value. In asset management and portfolio selection, the aim is for an investor to find the optimal portfolio, which would achieve the best results/returns given a level of acceptable risk. Bekaert and Wu (2000) explore specifically the relationship between the risks and return of investments, the criteria of investing and the diversification benefits thereof and found that volatility in equity markets is asymmetric: returns and conditional volatility are negatively correlated. . An investor seeks to decrease the risk associated with their portfolio. The 1980's saw an increase in studies alluding to the fact that in order to diversify a portfolio, an investor should spread their investments to include not only developed markets but developing markets too as they showed low correlations to developed markets, and thus providing an investor with more earning potential and less risk.

[1]South Africa tends to be excluded from African research due to the fact that South Africa is seen to be on par and sometimes better than various global emerging and developed markets. Examples of these being China, Brazil, China and India.

The aim of this study is to establish the performance of African stock markets that are at different levels of development (emerging and frontier) in order to establish whether an investor would have maximised wealth by including these stocks in a portfolio. This is done through looking at the financial market systems on the African continent, in particular the stock market system, and compares them with that of the emerging and the developed world.

1.3. Gap in Literature

Du Toit D. et al (2010), using weekly data from frontier, emerging and developed market indices looked at the benefit of including frontier market equities in a portfolio comprising of emerging and developed market equities. The inferences made as a result of the study shows that due to the low correlation between frontier markets, emerging and developing markets, including frontier market equities as a separate asset class to diversified equity portfolios resulted in an improvement in the risk-return characteristics of an investor's portfolio. This study looks at an analysis of the African emerging and frontier market indices currently trading on the African stock exchanges and compares them to that of the S&P 500 (developed market index) and the MSCI and FTSI emerging market indices. Moss et al (2007) concluded that although Africa has made headway in the expansion of domestic stock exchanges, there is a lack of investment in Africa's frontier markets outside of South Africa. Two schools of thought exist in this regard. The first is the market failure view, which states that Africa is somehow different and investors are not responding rationally to the continent's investment opportunities because of some hurdle such as a lack of information, perceptions of excessive risk and other unknown variables that systematically discourages investors from bringing their capital into Africa. A second is the market works view, which argues that there is nothing unusual or exotic about Africa and that investors value African investments like any other. If investors are avoiding the continent, it is likely because of orthodox reasons such as liquidity or to size of the markets and the low levels of GDP on the continent.

1.4. Research Problem

The usual problem faced by a large number of international investors is the maximisation of expected returns on investment given an acceptable level of volatility. Most African countries have existing stock market. Those that do not are establishing stock exchanges with the hope that they can reap the rewards and benefits of these said markets on the development of the economy. It is still not clear whether the level of risk and return investors enjoy justifies investing in African emerging market. More specifically, it has not been seen and studied what the emerging and frontier markets of Africa have to offer. From the perspective of investors in developed markets, what are the diversification benefits of investing in these newly available emerging and frontier markets? In addition, from the perspective of the developing countries themselves, what are the effects of increased foreign capital on domestic financial markets and ultimately on economic growth?

1.5. Research Objectives

The main objective of this study is

- To establish the performance of African emerging and frontier markets
- To establish the level of risk experienced by the investors in African emerging and frontier markets.
- To investigate the risk-return trade-off in African emerging and frontier markets.
- To investigate the performance of emerging and frontier markets compared to developed markets.

1.6. Research Questions

This paper seeks to answer the following questions and bridge the gap left by other studies:

1. Do African emerging and frontier equities provide a diversification effect to an investor?
2. Do African emerging and frontier markets offer significantly higher returns when compared to other emerging markets and developed markets?
3. What is the risk associated with investing in African emerging and frontier markets?
4. What is the risk return trade off in emerging and frontier markets?

5. Do returns from emerging markets exceed those of developed markets?

1.7. Structure of the Thesis

In the attainment of the objectives of the study, the paper is structured as follows; Chapter 2 presents and provides a theoretical understanding and a literature review of current work done on frontier markets and emerging markets. Chapter 3 covers the methodology and data employed in this study. Chapter 4 presents research results, and chapter 5 presents the discussion, conclusion and suggests further work that can be done.

1.8. Chapter Summary

This chapter sought to introduce the thesis and presents the what the research problem and research objective are. Section 1.2 covered the context of the study. Section 1.3 presented gaps in the literature. Section 1.4 stated the research problem. Section 1.5 presented the research objectives and hypothesis. Section 1.6 presents the research questions and section 1.7 presented the structure of the thesis. The next chapter provides a literature review on existing literature on stock market risk and returns as well as literature on investing in emerging markets and frontier markets.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter provides the review of the existing literature on stock market risk and returns as well as literature on investing in emerging markets and frontier markets. Section 2.2 presents literature on volatility and returns. Section 2.3 presents literature on investing in emerging markets. Section 2.4 presents literature on investing in frontier markets. Section 2.5 presents African stock markets and trading strategies that proved to be successful in emerging markets are presented. A history of these markets can be found in the appendix.

2.2. Stock Market Volatility and Returns

It is generally accepted that investors require a larger expected return from an asset with a higher risk value. The relationship however, between this higher expected return and the risk thereof is an area of financial research that has been studied intensely by various academics such as French et al. (1987*)*, Fama and Schwert (1987) and Harvey (1989) as it is important to asset management and portfolio diversification. In asset management and portfolio selection, the aim is for an investor to find the optimal portfolio, which would achieve the best return at the lowest possible risk. The first step before an investor makes an investment would be to decide what proportions of assets are to be held. The next step requires the gathering of information regarding the future behaviour of the chosen securities. The returns on an asset tend to normally come in the form of capital gains and dividends earned on the asset while it is held. Understanding volatility in emerging capital markets is important as this assists in; the determination of the cost of equity capital of an asset, the evaluation of investments, as well as in the decisions made with regards to the asset allocation process. Risk is characterised as being either systematic or unsystematic. Systematic risk is defined as the risk that cannot be diversified away through investing in various stocks. Unsystematic risk is defined as risk that can be diversified away and is thus risk that is specific to that stock. An investor would thus aim to hold a portfolio that consists mainly of systematic risk. Unsystematic risk should be wiped out through the holding

of negatively correlated assets. Academics have over the past couple of years looked at various risk measures. Markowitz (1959) for example compares several measures of risk such as the standard deviation, the semi-variance, expected value of loss, expected absolute deviation, probability of loss and maximum loss.

Volatility though, which is used as a measure/proxy for risk, in various asset pricing models such as the capital asset pricing model (CAPM) (Sharpe 1964) is generally measured by either the standard deviation or beta. The standard deviation measures the variance of returns above or below the true mean return while Beta measures the risk of an individual stock relative to the market. Overall, regardless of which measure of risk one uses, the greater the dispersion of actual returns from the expected returns, the greater the risk associated in investing in the stock. Essentially also implying that with a lower dispersion of actual returns from the expected return, the risk associated with the stock will be lower.

According to Howells and Bain (2005), no rational investor will incur unsystematic risk since it is not necessary. Secondly, the risk premium is only compensation for systematic risk. Thirdly, the standard deviation overstates the relevant level of risk faced by an investor who behaves rationally. Some studies have suggested that a mean-risk model does not fully capture the essence of portfolio selection since investors are not sure to present only one risk measure. Some authors such as Markowitz (1959) have thus suggested the use of two risk measures for portfolio selection instead of one. The knowledge of the risk and returns of the various stocks are important factors in diversification maximisation. In the asset allocation decision, to maximise the diversification effect, an investor would ideally like to invest in stocks that are negatively or lowly correlated to each other. Markowitz (1952) was the first author to put out a paper on portfolio selection. He proposed the E-V model that states that the best portfolio is one where expected return is maximised subject to actual variance or a portfolio that minimises risk, subject to given return. Markowitz (1959) went further to state that an investor should consider expected return a desirable thing and variance of return an undesirable thing. Markowitz (1959) suggested that an investor should look at minimizing variance and maximising mean/return of the portfolio through generating an efficient frontier, which illustrates to an investor the best solutions available for different expected returns and their corresponding variances. With this creation of the efficient frontier, an investor decides which solution

is befitting based on their current needs. The paper went further to state that in quantifying risk; an investor ought to use a risk measure depending on the investors needs as no one risk measure could satisfy different needs of different investors. Various authors such as Harlow 1991 have suggested the use of some downside risk measure, which is also quickly gaining popularity with academics as these measures make it clear that investors are happy with unexpected gain but not so much with unexpected loss. Downside risk can be measured by the semi-variance, expected loss or Value-at-Risk. Value-at-Risk measures the minimum loss corresponding with a certain worst number of cases but tends not to quantify how bad these worst losses are. To overcome this pitfall, Rockafellar and Ursayev (2000) came up with something called Conditional Value-at-Risk (CVAR) which measures the expected loss corresponding with a number of worst case scenarios based on a chosen confidence level. The semi-variance captures the expected value of the squared negative deviations of possible outcomes from the expected returns. As per Harlow 1991, the semi-variance captures the notion of downside risk and is an appropriate characterisation of investment risk and unlike the variance; the semi-variance does not increase with greater “upside potential”. Upside potential is rather captured by the mean of the return distribution. Markowitz documented the computational problems associated with the calculating of the semi-variance and thus uses the variance/standard deviation as a risk measure. Harlow 1991 however states that the variance is somewhat restrictive and is not consistent with an investor’s actual perception of risk.

Some academics such as Sharpe (1964) and French et al (1987) have found there to be a positive relationship between a portfolio’s expected returns and volatility. French et al 1987 find evidence of a positive relation between the expected risk premium of stocks and the predictable level of volatility in specific. A study by Bekaert and Wu (2000) for example found and contended that the relationship between volatility and expected returns is negative. The importance of this relationship lies in the fact that, the negative relationship between market volatility and expected market return immediately implies that the time-varying risk premium theory cannot be validly used to explain the behaviour of the stock market (Bekaert and Wu 2000).

Although the relationship between risk and return has been investigated extensively in developed countries, there is still a scant research of the same relationship in emerging African markets as well as frontier markets.

2.3. Investing in emerging markets

An emerging market is defined as a developing economy with stock markets that are beginning to demonstrate the features of mature stock markets in industrialised and developed countries. Bekaert and Harvey (2002) define an emerging market as a country with a per capita GDP that falls below a certain hurdle that changes through time. Emerging markets first became an investment option in the 1980's when their diversification effect was explored and their low correlation with developed / industrialised countries was studied (Harvey, 1995). The last two decades has seen significant growth in research done on emerging market finance that bridges investments, corporate finance in light of international economics, development economics, law, demographics and political science (Bekaert and Harvey, 2002). Interest in emerging market finance is due to the fact that these markets make up most of the world's land and population, and the increased potential of diversification, attracting a higher risk/reward benefit for an investor. Bekaert and Harvey (2002) explain the interest in emerging market analysis as an immediate 'out of sample' test of new theories as new markets migrate to the status of emerging. Bekaert et al. (1998), Bekaert and Harvey (1997) documented that emerging markets have characteristics differing from that of developed markets and thus require models tweaked and more suited to these environments. These characteristics include; low correlations to developed markets, higher volatility, higher average returns and easier predictability of returns.

Two of the most important findings of emerging market research are that market integration leads to higher correlation with the world, and that emerging markets have been found to have a higher average return than developed markets for the periods under study in the analysis covered. These studies also show that these markets tend to also have a higher risk/volatility level than developed markets.

The first studies on emerging markets looked at the theory of market segmentation and integration with world markets (Bekaert and Harvey, 2002). Integration can either

be economic or financial integration. Economic integration is defined as a decrease in barriers to trading in goods and services, while financial integration is defined as free access of foreigners to local capital markets and locals to foreign capital markets. In either case, a market is said to be fully integrated with world markets when the expected return of assets in the market with similar risk is the same irrespective of the country these returns are generated from. Emerging market studies on integration initially measured the impact of market integration on security prices. According to Bekaert and Harvey (2002), based on the Capital Asset Pricing Model (CAPM), the local expected return is calculated using the local beta and the local market risk premium. Given the high volatility of local returns, it is likely that the local expected return is high. In an integrated capital market, the expected return is determined by the beta with respect to the world market portfolio and the world risk premium. It is likely that this expected return is much lower due to less volatility in world markets. Hence, in the transition from a segmented to an integrated market, prices should rise and expected returns should decrease. Studies such as Harvey, 1995, Errunza et al., 1999 and Bekaert and Harvey, 1997 found that in segmented markets, there was high volatility in local returns resulting in higher expected returns. However, in an integrated market, the expected returns were lower. The studies jointly concluded that the more integrated a market becomes, with the world market, the more prices rise and the more returns decrease.

Collins and Biekpe (2003) added that when a market becomes fully integrated, companies are better able to access a larger new pool of funds that would not have been accessible before integration. The cost of equity at the same time also tends to decline and more investment options become viable to investors. This results in increased growth and employment for the country. Harvey (1995) showed that emerging market correlations was changing through time as they became more integrated with the global financial system. This integration with the global financial system tends to be caused by an increase in international investor participation in the economy. Bekaert (1995) found that the speed of the process of integration of a capital market with world markets is a gradual one. Thus investors are able to exploit the ‘advantages’ experienced from investing in an emerging market for some time. The liberalisation of financial markets does not mean that a market is fully integrated with world markets. Bekaert et al (2002a, b) modelled the importance of liberalisation

events and crisis on the flows and returns in emerging markets and found that the liberalisation process has led to a very small increase in correlations with the world markets and a small decrease in dividend yields which is attributed to a decrease in the cost of capital or an improvement of growth opportunities. Bekaert et al (2002a, b) also found that liberalisation of markets increased economic growth on average by an amount of 1% per year and that aggregate investments increased significantly thereafter, providing a channel for increased growth. Bekaert et al (2002a, b) also found that the claim by policy makers that foreigners induced excess volatility in local markets was not revealed in their study.

Segmented markets tend to be characterised by various barriers to investment discouraging foreign investment. Bekaert (1995) looks at barriers to emerging market investment and concludes that these risks are a direct function of the domestic policies pursued in the various country economies. These barriers include legal barriers, which arise from the different legal status of foreign and domestic investors. In addition, he documents indirect barriers that arise from information asymmetry, low levels of accounting standards and low investor protection. Thirdly, Bekaert (1995) discusses specific risks said to be associated with emerging markets, which are liquidity risk, currency risk, political risk, macroeconomic risk and country risk. These barriers tend to take time to disappear even after markets have been liberalised.

Bekaert and Harvey (2002) found that although generally market integration does leads to higher correlations with the world, this is not always the case. The study found that on average out of the 20 sample countries tested, 17 experienced an increase in correlation with the world while 3 did not. A reason given for this was that countries with industrialised structures much different from the worlds average structures might have little or no correlation with world equity returns even after liberalisation. An increase in the correlation of markets leads to a decrease in the benefits of the diversification effect.

Contagion is defined as abnormal correlation and refers to the spread of market disturbances from one market to another particularly during times of crisis and distress. Collins and Biekpe (2003) explain that the downside of increased integration is an increased exposure to global crises. The spread of crisis depends on the degree

of integration and thus the more integrated the market is, the more the contagious effects of a shock in another country.

There is an important link between the real economy and finance. The integration of markets tends to lead to an increase in foreign capital flows from investors in search of the diversification effect. This in turn tends to drive the prices of securities up in these markets and thus leads to a decrease in the expected return and the cost of capital in these markets. With this decrease in the cost of capital, projects that previously had a negative Net Present Value (NPV) become viable as the NPV increases and becomes positive. This increase in investments tends to lead to a real economic growth increase. Further, the increase in the number of foreign investors could lead to better political, economic and corporate governance. This would reduce both internal and external financing costs, thus increasing investments. Another consequence on the real economy is that the increase in liquidity gives rise to an increase in bank credit. This increase in lending gives rise to a consumption binge, which increases the prices of assets such as real estate etc. The increases in prices could lead to an increase in the real exchange rate of a country.

The economic rationale for stock market development in emerging markets as well as on the African continent cannot be argued. There is extensive research exploring the relationship between financial system development and economic growth by academics such as Starkey (2010) and Aretis et al (2001).

A financial system refers to the banking system (financial intermediaries), the financial market system and other financial institutions. The financial market includes, the bond market (for both government and corporate bonds), stock markets where equities are traded, foreign exchange markets, and derivatives markets. The participants of these markets (the financial system) are the lenders who are said to have surplus economic units and borrowers who are said to be in a deficit situation where their income does not meet their spending patterns. Financial systems need development from the fact that the costs associated with acquiring/gathering information, enforcing contacts and making transactions is high. This increases the incentive for the establishment of financial instruments, financial intermediaries and financial markets (Levine, 1997). Financial intermediaries thus arise from the problems of information asymmetry. The development of the banking sector is important for stock market development

particularly in Africa as per Levine (2005). At the early stages of its establishment, the stock market is a complement rather than substitute for the banking sector. Developing the financial intermediary sector can promote stock market development (Adjasi and Yartey, 2007). Demirguc-Kunt and Levine (1996) find evidence that countries with better-developed stock markets also have better developed banks and non-bank financial intermediaries while countries with weak stock markets tend to have weak financial intermediaries. They thus conclude that the development of a stock market goes hand in hand with other aspects of financial development.

Demirguc-Kunt and Levine (1996) found that risk diversification through internationally integrated stock markets is a vehicle through which economic growth could be affected. High return projects tend to be comparatively risky and thus stock markets that facilitate risk diversification encourage a shift to higher return projects and a better functioning, more internationally integrated stock market boosts economic growth by shifting societies savings into higher return investments all things being equal. However, greater risk sharing can reduce the need for precautionary savings, savings rates and thereby retard economic growth. Therefore, there exists ambiguity about the effects of greater risk sharing through internationally integrated stock markets on economic growth.

The link between financial development and economic growth can be traced back to the work of Joseph Schumpeter in the early 20th century, and later to Ronald McKinnon (1973) and Edward Shaw (1955). Schumpeter (1932) and Goldsmith (1969) brought about the importance of financial system development. The work of Gurley and Shaw (1955) McKinnon (1973) and Shaw (1973) tied together neatly economic growth and financial development. Gurley and Shaw (1955) further stated that “economic development is retarded if only self-finance and direct finance are accessible, if financial intermediaries do not evolve” (Gurley and Shaw 1955). Further studies (e.g. Demirguc-Kunt and Levine, 1996; Levine, 1997; Thakor, 1996) have dug more into the relationship and have looked closely at causality. Although literature has been mixed and inconclusive, the analysis of the relationship has brought about four schools of thought on both the existence of the relationship and the direction of causality. These schools of thought are the supply leading view, the demand following view, the bilateral relationship and the no-relationship view. The main conclusion from these schools of thought is that broadly, a well-functioning stock market system allows

for the lowering in the costs of mobilising financial resources and allocating these resources to good use. Demirguc-Kunt and Levine (1996) find data that supports the view that the financial structure of economies varies with their income. When looking and comparing richer nations with poorer economies, commercial banks and non-bank financial institutions grow in importance, which means that at low levels of development, commercial banks are the dominant financial institutions. As economies grow however, both nonbanks and stock markets begin to develop more. Demirguc-Kunt and Levine (1996) also found that the financial systems tends to allocate more credit to the private sector as a percentage of GDP in richer countries and these countries tend to have a larger overall financial system and stock market as a percentage of GDP.

The supply leading view states that financial development has a positive effect on economic growth and thus leads to an increase in the latter. The financial sector channels limited resources from surplus units to deficit units and thus provides an efficient allocation of resources thus resulting in economic growth. This view further states that financial intermediaries contribute to economic growth by raising the efficiency of capital accumulation, the marginal productivity of capital (Goldsmith, 1969), the savings rate and the rate of investment in the economy (McKinnon 1973; Shaw 1973). Quartey and Prah (2008) further take this school of thought and divide it into the structuralists and the repressionists. The structuralists state that the quantity and the composition of financial variables induce economic growth by directly increasing savings in the form of financial assets, thereby producing capital formation and thus economic growth. The repressionists hold that financial liberalisation in the form of an appropriate positive real rate of return on real cash balances is a vehicle for promoting economic growth. Therefore, a more liberalised financial system will induce an increase in savings and investments, which ultimately increases economic growth.

The demand following view, brought about initially by Robinson (1952) and then by Patrick (1966) states that financial development follows economic growth. Economic development is said to produce demands for financial arrangements and the financial system responded automatically to these demands, basically implying that there was

no finance-growth relationship. The financial system came as a necessity from the demand for such a system.

The bilateral relationship view states that the relationship is bi-directional. Starkey (2010) and Aretis et al (2001) concluded that there was indeed a relationship between financial systems and economic growth. Berthelemy and Varoudakis (1996) found that, as with Starkey (2010), causality run both ways between financial development and economic growth. According to Berthelemy and Varoudakis (1996), “Growth in the real sector causes the financial market to expand, thereby increasing banking competition and efficiency. In return the development of the banking sector raises the net yield on savings and enhances capital appreciation and growth” (Berthelemy and Varoudakis, 1996 pp. 300).

The no-relationship view was brought about by Lucas (1988) and argues that there exists no relationship between financial system development and economic growth. Lucas’s (1988) view was that economists badly over stress the role of financial factors in economic growth.

Regardless of the view taken, apart from the last view by Lucas (1988), it can be seen that either way, the development of one’s financial system does have an effect on economic growth.

The lack of focus on Africa as an emerging market is due to information availability constraints. The statistics on stock markets was not available as easily as in developed markets. Much of the research based on the financial system has tended to focus on the banking system liberalisation as opposed to the liberalisation of the stock market which has only recently begun to gain momentum. Demirguc-Kunt and Levine (1996) attribute development economics focus on the banking sector to the fact that because economic development is tied to how the financial system develops, and thus due to low growth previously in emerging markets, the financial system comprises mostly of central and commercial banks. Demirguc-Kunt and Levine (1996) also summarised works by other authors and found that banks and other financial intermediaries have important advantages to play over stock markets in the reduction of information asymmetries that produce adverse selection problems and in ameliorating the inefficiencies created by information differences. Prior to 1989, there were only eight stock markets on the African continent. This has since increased to 29 stock

exchanges (2 being regional exchanges). Africa as with many emerging markets in the world was plagued with debt crises due to the rate and the levels at which borrowings essentially from commercial banks were made. Fixed income, equity and foreign direct investment has replaced commercial bank debt as the dominant sources of foreign capital. In recent times, the development of country stock markets has been central to the domestic financial sector development programs of most African countries. Most African programs of financial liberalization tend to be incomplete without the establishment and development of stock markets, hence showing the importance of these markets in the development of economies. The drive towards the establishment of stock markets in African countries during the last few decades may be linked to other important developments in the global economy. The financial markets of many advanced countries have undergone tremendous changes and become increasingly integrated (Adjasi and Yartey 2007). African countries have seen a total reduction in Africa's external debt from 62% of GDP in 2003 to 17% in 2011. Demirguc-Kunt and Levine (1996) discuss how in the 1980's, the World Bank devoted most of its time and resources into improving financial systems of countries to stimulate economic growth through the management of banking systems primarily. This was done through removing interest rate controls, reducing government involvement in credit allocations, minimising taxes of financial intermediaries, managing bank insolvencies and training bank managers and supervisors. More recently, however, the World Bank has stressed the development of capital markets.

A study by Kim and Singal (2000)looks at the changes in the economy that occur when a country allows foreign portfolio investment thus allowing foreign investors to participate in emerging stock markets. The study estimates changes in the level and volatility of stock prices, exchange rates and inflation rates around market openings. The study found that stock returns increase immediately after market opening but fall subsequently thereafter. There was no accompanying increase in the volatility of stock returns. Kim and Singal (2000) also found was that stock markets tend to become more efficient, as determined by testing the random walk hypothesis and that on average, the evidence suggested that market openings have favourable effects on the emerging economies. According to the paper, there are several benefits to opening a countries market to foreign investors which include; an opportunity to attract foreign capital to financing of economic growth, the opening of markets hastens the level of

development of stock markets, the opening of the market leads to a reduction of the cost of external capital, the increase in foreign equity flows results in global diversification that have other benefits for emerging economies such as international risk sharing through global diversification which results in improved resource allocation, and finally, the opening of markets means foreign investors demand accountability of management and shareholder rights to protect themselves against exploitation and improves transparency and improved disclosure rules that are critical for improved allocation efficiency of capital. However, Kim and Singal (2000) caution that this must be looked at and weighed against various uncertainties associated with opening of markets by emerging countries. One of these concerns is the movement of so called 'hot money'. Hot money is defined as an international flow of funds highly sensitive to differences in interest rates, expectations of future economic growth and expected returns from holding securities. Given the sensitivity of investments, a small shock to the economy can easily lead to a volatile change in fund flows, which can destabilise an economy. The opening of economies may also lead to exposure to foreign influence thus meaning if international/foreign stocks are volatile, domestic stocks may also become volatile. Greater volatility as mentioned before could make investors more averse to holding the stocks and lead them to demand a high return, which implies a higher cost of capital and less investments.

Despite the growth in the number and sizes of Africa's stock exchanges, existing literature such as Ntim (2012) suggests that the exchanges remain highly fragmented, small, illiquid and technologically weak, severely affecting their informational efficiency. Moss et al (2007) concluded that although Africa has made headway in the expansion of domestic stock exchanges, there is a lack of investment in Africa's "frontier markets" outside of South Africa. Two schools of thought exist in this regard. The first is the market failure view, which states that Africa is somehow different and investors are not responding rationally to the continent's investment opportunities because of some hurdle such as a lack of information, perceptions of excessive risk and other unknown variables that systematically discourages investors from bringing their capital into Africa. A second is the market works view, which argues that there is nothing unusual or exotic about Africa and that investors value African investments like any other. If they are avoiding the continent, it is likely because of orthodox reasons such as liquidity or to size of the markets and the low levels of GDP. An

investment climate survey done by Moss et al (2007) showed that business losses due to investment constraints such as power outages, transport failures, and logistics delays, are largely responsible for shortfalls in productivity observed. African firms tended to report substantially higher losses than their counterparts in higher-performing countries, which translated into a corresponding decline in measured productivity. The data of the study further suggested that African firms faced constraints that prevent them from increasing productivity and expanding their operations, thus creating a high cost business environment, reducing the competitiveness of African firms, and thereby limiting their ability to grow. A similar study by Kenny and Moss (1998) found that African markets are small in size, and are small in comparison to their economies, which is not typically the case with traditional emerging markets and developed markets. The value of stocks markets outside that of South Africa was only 0.94% of the world stock market capitalisation as per the World Federation of exchanges in 2012. Many analysts viewed stock markets in developing countries as casinos that had little positive and potentially large negative impacts on development and not many companies finance investments through the issuance of equity, which implies that stock markets were unimportant for economic growth. Demirguc-Kunt and Levine (1996) explored the role of stock markets in economic development in developing countries and found evidence that stock markets affect economic activity through the creation of liquidity. Long-term investments tend to require long-term commitment of capital but because investors are reluctant to relinquish control of their savings for long periods of time, liquid stock markets tend to make investments less risky and more attractive to investors. Less liquid and more profitable stock market liquidity leads to greater savings and investments.

Low correlation or better off negative correlation across markets is the main aim of global portfolio diversification. This allows investors the opportunity to reduce their total portfolio risk without affecting returns too much. Boucrelle et al (1996) shows that international correlation is evolving overtime and that volatility is contagious. This evolution is shown as an overall increase in correlation over time that leads to an eroding of the advantages of risk diversification in the long run. This has been found to be the case with emerging market investments as emerging markets have

integrated with the global economy and become more correlated to developed markets.

2.4. Investing in frontier markets

As emerging markets have grown and become more integrated with the global economy, the stocks within these markets have tended to become more and more correlated with developing market stocks (Demirguc-Kunt and Levine, 1996). Given this rapid growth and development of emerging markets, frontier markets may be at the stage similar to that of emerging markets a couple of years ago. Frontier markets, which were characterised as being highly volatile risky and inefficient have recently, improved and are now easily accessible. Frontier markets are defined pre-emerging markets and a subset of emerging markets. This term was also coined by the IFC in 1992 and is said to represent countries that are investable but have less capitalisation (size) and liquidity than ordinary emerging markets. In recent years, frontier markets have only just become accessible to foreign investors through the lowering of restrictions on foreign ownership, reduction of capital gains taxes and increased liquidity in local markets. Studies have shown that there exists economic and investment rationale in considering allocating funds towards these markets. Economic rationale centring mainly on the growth of these economies as these regions have experienced strong growth and will continue to do so in the future due to the fact that the economies and capital markets are less mature and leave a large amount of opportunity for growth. Investment rationale is based mainly on modern portfolio theory, which says that an investor can decrease the risk of their portfolio and increase their returns through diversification by holding assets that are lowly or negatively correlated to one another. The less the correlation between country stocks, the greater the potential benefit of diversification. Another investment rationale to be found is that these markets have been proven to provide high returns.

The role of integration and the contagion effect of Africa with global markets has been the subject of various emerging market research papers due to the various financial crises around the world, the most recent being the financial crisis that hit in 2008, that has led to investors seeking safe havens. The interest in frontier markets was sparked recently, in 2007, with the creation of a frontier market index by Standard and Poor's (the Select and Extended Frontier Indexes) and Morgan Stanley who created the

Frontier Markets Index in the same year. Contagion is defined as the spread of market disturbances from one market to another. Biekpe and Collins (2003) studied to gain a greater understanding of the relationship between African markets and global emerging market returns, as well as the relationships between African equity returns. The results of this study showed that there was evidence of contagion in African markets from emerging market crisis only in the largest and most traded markets (South Africa and Egypt). It can, thus, be concluded that African equity markets offer a true source of diversification to global emerging markets. Du Toit et al (2010) explore the impact of including frontier market equities in a diversified international equity portfolio consisting of both emerging and developed market equities. They found that while emerging equity indices have been highly correlated to developed markets, correlations between investable frontier market indices and both emerging market and developed market indices have been significantly lower. The paper concludes that the inclusion of equities from frontier markets in an internationally diversified equity portfolio is significantly advantageous, leading to portfolios with superior risk-return characteristics. In the same paper, du Toit et al (2010) allude to the fact that there is little literature on frontier markets due to the infancy of the interest in the markets. However, based on the little research, it can be concluded that Frontier market returns can be impressive, the co-movement of frontier markets with emerging and developing markets is low and the volatility in frontier markets is relatively lower than that of other markets (du Toit et al 2010).

Most African countries have and are establishing stock exchanges with the hope that they can reap the rewards and benefits of these said markets on development. It is still not clear whether the level of risk and return investors enjoy justifies investing in African emerging market but more specifically the frontier markets.

2.5. African Stock Markets and Trading Strategies in Emerging Markets

Ntim (2012) offers a five-tier classification of African stock markets. The first tier is formed solely by South Africa, which is the largest, most infrastructurally developed, and one of the oldest stock exchanges in Africa. The second tier consists of a group of median size markets, which like South Africa, have been in existence for a number of years. Tier two consists of Egypt, Kenya, Nigeria, Morocco, Tunisia and Zimbabwe. The third tier is made up of a group of new and small, but rapidly growing markets, consisting of Botswana, Cote d'Ivoire, Ghana, Namibia and Mauritius. The fourth tier consists of a group of very new and small markets, including Libya, Malawi, Mozambique, Sudan, Swaziland, Tanzania, Uganda, and Zambia, whose existence have been widely acknowledged (at least recognised by ASEA), but are struggling to take-off. The final tier consists of a group of seven markets, namely, Algeria, Angola, Cameroon, Cape Verde, Gabon, Rwanda and Sierra Leone, which either despite having been in existence for relatively longer time like Algeria (1993), Cameroon (2001), Gabon (2001), and Cape Verde (2005), are not widely known (not even recognised by ASEA) or are not formally known because they are simply too young, such as Angola (September, 2007), Rwanda (January, 2008) and Sierra Leone (April, 2012).

Trading strategies can be either "univariate" strategies, which rank stocks according to a single return factor, or "multivariate" strategies, which combine measures of value, momentum and/or earnings revisions to produce the stock ranking. Van Der Hart et al (2008) test what trading strategies can be implemented successfully in practice by a large institutional investor, facing a lack of liquidity, restrictions on foreign ownership and substantial transaction costs. This study was done as few studies investigating individual stock selection on emerging markets exist and provided conflicting evidence such as investors earning a premium for investing in large firms and growth stocks, investors reporting a premium for small firms and value stocks and investors earning for beta and turnover. Van Der Hart et al (2008) finds that even under such realistic circumstances a strategy based on value and momentum earns significant excess returns in emerging markets. The study compared this to developed market portfolios that were formed based on earnings-to-price (E/P), book-to market (B/M), price

momentum or earnings revisions have been found to earn significant excess returns. According to the paper, behavioural explanations for earning superior returns of value strategies is that investors overestimate the actual difference in future earnings growth between glamour and value stocks. Investors are overly optimistic about glamour stocks and excessively pessimistic about value stocks because they simply extrapolate past growth rates into the future, failing to impose mean reversion on their growth forecasts. Their higher E/P ratios imply that value stocks are expected to continue to show lower earnings growth in the future. In practice however, they indeed do experience lower earnings growth, but to a lesser extent and for a much shorter period than the market implicitly expects. The economic rationale behind these findings is that competition among companies makes above average earnings growth only sustainable for short periods of time. According to this said behavioural explanation, “naive” investors do not fully take this “economic law” into account when forecasting earnings growth, but extrapolate past growth rates too far into the future. Value strategies generate superior returns because they are “contrarian” to these naive extrapolation strategies.

A behavioural explanation for momentum and earnings strategies is based on the idea that financial markets respond only gradually to new information, to earnings-related news in particular. Empirical evidence was found that stocks with high price momentum or high past earnings revisions have higher returns around earnings announcements, higher earnings revisions and higher earnings surprises for some time after portfolio formation. Momentum and earnings revisions strategies thus are successful because they exploit the initial under-reaction of the market to the information in past returns and past earnings revisions.

2.6. Chapter Summary

The aim of this section was to provide a review of the literature on returns and volatility, emerging markets, frontier markets, a list of African markets and trading strategies used and successful in emerging markets. The next section looks at the methodology used in this paper and the ways in which the data was gathered.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

The previous chapter provided a review of the literature on returns and volatility in emerging markets and frontier markets. A list of African markets was provided and the trading strategies used and successful in emerging markets were discussed. This chapter introduces and describes the research methodology employed in this study. Section 3.2 provides the data and data sources. Section 3.3 presents the research design and section 3.4 provides the chapter summary, which concludes the chapter.

3.2. Data and Data Sources

The crux of this research is to establish whether there exists reason for an investor to include African stocks in their portfolio as a diversifiable and return enhancing tool. In other words, do African emerging and frontier markets outperform other markets?

The African continent has twenty-nine exchanges. This study analyses only nine of these twenty-nine exchanges because only these nine exchanges have sufficient information for the research period analysed. A list of all African exchanges are to be found in the appendix of this study. The data used in this research is the indices' monthly price data for nine African emerging and frontier markets, the S&P500, the MSCI and FTSE emerging market indices. The specific African indices investigated are: Botswana (BGSMDC Index), Egypt (CASE 30 Index), Kenya (KNSMINDX Index (top 20)), Mauritius (SEMDEX Index), Morocco (MCSINDX Index), Nigeria (NGSEINDX All Share), South Africa (Top 40 Index), Zambia (LUSE All Share Index) and Ivory Coast. Nine African exchanges are used to due to information constraints and because some of the exchanges (such as Somalia, Seychelles, Cameroon, Libya, Rwanda and Cape Verde were only created after 1999). In adherence with the MSCI, S&P, The Economist, IMF and FTSE economists' country listings, of the 9 indices looked at, Egypt and South Africa are classified as emerging markets while Botswana, Kenya, Ivory Coast, Mauritius, Morocco, Nigeria and Zambia are classified as frontier markets. In some literature, it is argued that South Africa is merely termed an emerging market as the country is found in Africa. The South African JSE is the 14th largest exchange in the world in terms of market cap. The S&P 500 was used as a proxy for

developed market index and the MSCI and FTSE emerging market indices were used to represent world emerging markets.

The monthly dollar based prices for all indices were collected from the *Bloomberg* database and brokerage firm *JP Morgan Chase*. The period analysed is from 31 January 1999 until 31 January 2014. The study uses monthly stock prices as opposed to daily stock prices due to some specifics on some African stock exchanges, such as the fact that there is poor liquidity on these markets. Only indices that have full data over the sample period are included in the study. The dollar-based prices were used for ease of comparison although Forbes and Rigobon (2002) analysis show that using dollar and local undollarized prices yield very similar results.

3.3. Research Design

3.3.1 Measuring performance of indices

The individual return for all sample indices is calculated using the following formula:

$$R_i = (p_i - p_j) \div p_j$$

Where R_i denotes the change in the price of the stock, i.e. return at period i, P_i denotes return in the current month and P_j denotes previous month's returns.

The mean return for each index over the sample period was then calculated.

The performance of individual African emerging and Frontier markets is determined by computing the annualized return for each index over 1, 3, 5, 10, 12 and 15 year periods and these annualized returns are compared to the annualized return of S&P 500, MSCI and FTSE emerging market indices in order to assess whether the African markets outperformed or underperformed the developed economies and emerging markets.

The annualized index returns for 1, 3, 5, 10, 12 and 15years are calculated as follows:

Compound Annual Growth Rate: $(\text{End Value}/\text{Beginning Value})^{(1/\text{number of years})} - 1$

The mean difference test between the African indices and the international indices (S&P, MSCI and FTSE) was performed to assess whether there is a significance difference their means. In order to do this t test, f tests are carried out initially to

determine whether the variances of the returns looked at were equal or not. The hypothesis being tested is:

H_0: $\mu_1 = \mu_r$, the means are equal

H_1: the means are different from each other

Where μ_r = the mean of the individual country indices

3.3.2 Measuring indices risk

Traditional finance posits that there is a positive correlation between returns and risk. This section of the research sought to establish the volatility/risk in each of the indices in the sample and to further establish whether the volatility in different indices is significantly different from each other. The annualised standard deviation for 1, 3, 5, 10, 15, and 16 years is calculated as follows:

The standard deviation is calculated as per the below formula:

$$s = \frac{\sqrt{\Sigma(\mathrm{x} - \mathrm{y})2}}{\mathrm{N} - 1}$$

Where s = standard deviation

x= each value in the sample

y= the mean of the values

N= the number of values in the sample (sample size)

Volatility of the returns will then be calculated and interpreted. The Volatility of an asset is captured by the standard deviation of a variable around its mean. This is a systematic risk measure that captures both the upside and downside of risk and gives the same amount of deviations below and above the mean. Harlow (1991) stated that although a downside risk measure is more appropriate in calculating the level of risk by capturing the returns about 'some level', downside risk is an intuitive measure and the measurement of this 'level' differs from one investor to another. The asset allocation in a downside risk framework determines an investment opportunity set for

downside adverse investors that is at least as efficient as that derived using the variance and other conventional techniques.

The standard deviation of the frontier markets, emerging markets and foreign markets will then be compared to establish whether there is a difference between and among the standard deviations. An F test will be used to test the following hypothesis:

H_0: $\sigma_1 = \sigma_r$, the standard deviations are equal

H_1: $\sigma_1 \neq \sigma_r$ standard deviations are different from each other

Where σ_r= the standard deviation of the individual country indices

3.3.3 Measuring correlation between indices

The study further looked at the correlation between the emerging, frontier and developed markets indices. This analysis was done in order to establish whether there is truly a diversification effect through investing in frontier shares.

The correlation co-efficient is computed using the following formula:

$$P_{xy} = \text{cov}(x,y) \div \delta_x \delta_y$$

Where Cov (X,Y) – measures the degree to which returns of two assets (in this case x and y) move in tandem

The correlation of emerging and frontier markets was examined and compared to those of international indices representing developed economies and other emerging markets.

3.4 Chapter summary

This chapter provides information on the methodology used in this paper and the sources of data. The design of the research was presented and discussed. The next chapter presents the results obtained from the analysis done.

CHAPTER 4: PRESENTATION OF RESULTS

4.1. Introduction

The previous chapter discussed the methodology employed in this research. The main purpose of this chapter is to present the results of the study, which then assist in drawing a conclusion to this thesis. The essence of this study is to establish whether investing in emerging and frontier markets in Africa creates value for investors. Section 4.2 presents the descriptive statistics. Section 4.3 provides the analysis of annual returns and the performance of African markets compared to international markets over 1, 3, 5, 10, 12 and 15 year periods. Section4.4 provides an analysis of the correlation between the emerging, frontier and other indices.

4.2. Descriptive statistics

Table 1 below shows the mean, median, standard deviation, skewness, highest and lowest values of the returns for all indices in the sample.

The mean return for emerging and frontier African markets was higher in comparison to their international counterparts over the 15-year period. The standard deviations of the African emerging and frontier markets have also been higher on average which is in line with financial theory that the higher the return, the higher the risk. The highest average return over the 15 years was in Zambia with an average mean of 1.9%, an average yearly return of 22.8% over the 15-year period and a standard deviation of 10%. Zambia is followed by Egypt with a mean of 1.27% and a standard deviation of 10%. Egypt is followed by Nigeria with a mean of 1.19% and a standard deviation of 8.54%. Following Nigeria is South Africa with a mean return of 1.12% and a standard deviation of 7.37%. Botswana is next with a mean return of 1.02% and a standard deviation of 5.31%.

The FTSE emerging market index comes in after Botswana with a mean return of 0.91% and a standard deviation of 6.79%. Mauritius is next with a return of 0.89% and a standard deviation of 5.49. Following Mauritius very closely is the MSCI emerging market index with a mean return of 0.88% and a standard deviation of 6.81. Ivory Coast has a mean return of 0.51% and a standard deviation of 5.62%. Morocco has a mean return of 0.40% and a standard deviation of 5.15%. Kenya has a mean return of

0.31% and a standard deviation of 6.75%. Lastly with the lowest is the S&P 500 with a mean return of 0.29% and a standard deviation of 4.41%.

In general, over the 15-year period the returns of some of the emerging and frontier markets of Africa analysed have performed better than the world emerging market indices and the developed country index. The highest return range is 73%, which was experienced in Zambia. Followed by 58% in Egypt. The largest drop in returns of 46.63% was experienced in Egypt. The skewness is tabled in Table 1. The skewness indicates whether the information being analysed is from a normal distribution or not. Based on the numbers in Table 1, it is likely that the rates of return are not drawn from a normal distribution. Mauritius, South Africa, Kenya, the MSCI emerging market and FTSE emerging market and the S&P 500 have shown negative skewness while the rest show positive skewness.

Table 1: Descriptive Statistics

	Mean	Median	Standard Deviation	Skewness	Highest	Lowest
Panel 1: Emerging Markets						
Egypt	0.0127	0.0002	0.1016	0.5884	0.5887	-0.4663
South Africa	0.0112	0.0060	0.0737	-0.4967	0.1635	-0.5606
Panel 2: Frontier Markets						
Botswana	0.0102	0.0071	0.0531	1.4575	0.3464	-0.1504
Ivory Coast	0.0051	0.0040	0.0562	0.6822	0.2548	-0.1957
Kenya	0.0031	0.0030	0.0675	-0.2018	0.2307	-0.2519
Mauritius	0.0089	0.0044	0.0549	-0.2634	0.1772	-0.2446
Morocco	0.0040	0.0000	0.0515	0.4184	0.3754	-0.1350
Nigeria	0.0119	0.0060	0.0854	0.0392	0.4976	-0.4379
Zambia	0.0190	0.0061	0.1010	2.2953	0.7333	-0.2611
Panel 3: Foreign Indices						
MSCI Emerging Markets	0.0088	0.0075	0.0681	-0.4921	0.1627	-0.2750
FTSE Emerging Markets	0.0091	0.0063	0.0679	-0.4942	0.1753	-0.2804
S&P 500	0.0029	0.0079	0.0441	-0.5571	0.1077	-0.1694

4.2. Annualized returns of African Emerging and frontier markets compared to international markets

The tables below show the analysis carried on the 1, 3, 5, 10, 12 and 15-year annual returns and standard deviations.

Table 2 – Botswana performance compared to international indices

Panel A						
	S&P 500 standard deviation	**Botswana standard deviation**	**Difference**	**F value**	**P Value**	**Significance**
1 Year	0.038791	0.102773	0.063982	7.019446	0.000990	Yes
3 Year	0.047552	0.069237	0.021685	2.120040	0.013437	Yes
5 Year	0.047770	0.059861	0.012091	1.570286	0.041532	Yes
10 year	0.044466	0.059316	0.014851	1.779499	0.000878	Yes
12 year	0.045691	0.056531	0.010840	1.530771	0.005532	Yes
15 year	0.044131	0.053148	0.009017	1.450382	0.006628	Yes
Panel B						
	MSCI emerging markets standard deviation	**Botswana standard deviation**	**Difference**	**F-Value**	**P value**	**Significance**
1 Year	0.064607	0.102773	0.038166	2.530438	0.060751	No
3 Year	0.073250	0.069237	-0.004013	0.893420	0.368561	No
5 Year	0.066249	0.059861	-0.006389	0.816426	0.217230	No
10 year	0.069780	0.059316	-0.010463	0.722589	0.038193	Yes
12 year	0.069869	0.056531	-0.013338	0.654635	0.005731	Yes
15 year	0.068085	0.053148	-0.014937	0.609358	0.000497	Yes
Panel C						
	FTSE emerging markets standard deviation	**Botswana standard deviation**	**Difference**	**F-Value**	**P value**	**Significance**
1 Year	0.062560	0.102773	0.040212	2.698721	0.049262	Yes
3 Year	0.072744	0.069237	-0.003508	0.905886	0.384221	No
5 Year	0.065839	0.059861	-0.005978	0.826649	0.231564	No
10 year	0.069409	0.059316	-0.010092	0.730335	0.043251	Yes
12 year	0.069733	0.056531	-0.013202	0.657205	0.006121	Yes
15 year	0.067900	0.053148	-0.014751	0.612691	0.000564	Yes

Panel D

	S&P 500 returns	Botswana returns	Difference	T Test	Significance
1 Years	0.101976	0.391509	0.289533	0.777010	No
3 Year	-0.036919	0.202902	0.239821	1.495997	No
5 Year	-0.022664	0.216154	0.238818	1.775197	No
10 year	-0.040459	0.149239	0.189698	2.388790	No
12 years	0.001373	0.138747	0.137374	1.849782	No
15 years	0.023145	0.111779	0.088634	1.421090	No
Panel E					
	MSCI emerging markets returns	**Botswana returns**	**Difference**	**T Test**	**Significance**
1 Years	0.670068	0.391509	-0.278559	0.379560	No
3 Year	0.037151	0.202902	0.165750	0.679151	No
5 Year	0.097906	0.216154	0.118248	0.592123	No
10 year	0.057865	0.149239	0.091374	0.700624	No
12 years	0.117824	0.138747	0.020922	0.118417	No
15 years	0.080338	0.111779	0.031442	0.217479	No
Panel F					
	FTSE emerging markets returns	**Botswana returns**	**Difference**	**T Test**	**Significance**
1 Years	0.652174	0.391509	-0.260664	0.340840	No
3 Year	0.048349	0.202902	0.154552	0.737758	No
5 Year	0.101726	0.216154	0.114428	0.554620	No
10 year	0.063741	0.149239	0.085498	0.650037	No
12 years	0.124309	0.138747	0.014437	0.040447	No
15 years	0.083417	0.111779	0.028363	0.179543	No

Table 2 shows the annualised dollar returns of Botswana over the 6 period's analysed which range from 11.17% and 39.15%. Botswana out-performed the S&P 500 whose return range from -4% to 10%. The MSCI and FTSE emerging market indices returns were similar because the indices comprise of similar countries. The returns range from a minimum of 3% and a maximum of 67% experienced in the 1-year holding period. The standard deviations of Botswana range from 5% to 10%. The S&P 500 have standard deviations that range from 3% to 4%. The MSCI and FTSE standard deviations range from 6% to 7%. F tests were run in order to establish whether there were significant differences between Botswana standard deviations and the 3 international indices. The variances were found to be significantly different for all except years 1, 3, and 5 with the FTSE emerging market indices and years 3 and 5 for the MSCI emerging markets indices. T tests were run to establish whether the

means between Botswana and the indices were significantly different. The study found that none of Botswana returns was significantly different from the S&P 500 and the emerging market indices. It can be argued that the results produced indicate that the world emerging markets are on par with African markets.

Table 3 – Egypt performance compared to international indices

Panel A						
	S&P 500 standard deviation	**Egypt standard deviation**	**Difference**	**F-Value**	**P Value**	**Significance**
1 Year	0.038791	0.095007	0.056216	5.998716	0.002054	Yes
3 Year	0.047552	0.087897	0.040346	3.416800	0.000189	Yes
5 Year	0.047770	0.087343	0.039573	3.343090	0.000003	Yes
10 year	0.044466	0.107876	0.063410	5.885695	0.000000	Yes
12 year	0.045691	0.060472	0.014781	5.325897	0.000000	Yes
15 year	0.044131	0.101557	0.057425	5.295686	0.000000	Yes
Panel B						
	MSCI emerging markets standard deviation	**Egypt standard deviation**	**Difference**	**F-Value**	**P Value**	**Significance**
1 Years	0.064607	0.095007	0.030400	2.162476	0.098008	No
3 Year	0.073250	0.087897	0.014647	1.439897	0.139364	No
5 Year	0.066249	0.087343	0.021093	1.738146	0.017051	Yes
10 year	0.069780	0.107876	0.038096	2.389963	0.000001	Yes
12 year	0.069869	0.060472	-0.009397	2.277622	0.000001	Yes
15 year	0.068085	0.101557	0.033472	2.224909	0.000000	Yes
Panel C						
	FTSE emerging markets standard deviation	**Egypt standard deviation**	**Difference**	**F-Value**	**P Value**	**Significance**
1 Year	0.062560	0.095007	0.032447	2.306288	0.081036	No
3 Year	0.072744	0.087897	0.015153	1.459987	0.130482	No
5 Year	0.065839	0.087343	0.021504	1.759909	0.015157	Yes
10 year	0.069409	0.107876	0.038467	2.415582	0.000001	Yes
12 year	0.069733	0.060472	-0.009260	2.286564	0.000001	Yes
15 year	0.067900	0.101557	0.033657	2.237081	0.000000	Yes

Panel D

	S&P 500 returns	Egypt returns	Difference	T –Test	Significance
1 Years	0.101976	0.472000	0.370024	0.659302	No
3 Year	-0.036919	-0.270637	-0.233717	1.014150	No
5 Year	-0.022664	-0.023477	-0.000812	0.176291	No
10 year	-0.040459	0.101946	0.142405	1.599094	No
12 years	0.001373	0.136268	0.134895	1.444451	No
15 years	0.023145	0.095349	0.072203	1.193924	No

Panel E

	MSCI emerging markets returns	Egypt returns	Difference	T -Test	Significance
1 Years	0.670068	0.472000	-0.198068	0.555060	No
3 Year	0.037151	-0.270637	-0.307788	1.334080	No
5 Year	0.097906	-0.023477	-0.121383	-0.597800	No
10 year	0.057865	0.101946	0.044081	0.573351	No
12 years	0.117824	0.136268	0.018443	0.333476	No
15 years	0.080338	0.095349	0.015011	0.431980	No

Panel F

	FTSE emerging markets returns	Egypt returns	Difference	T -Test	Significance
1 Years	0.652174	0.472000	-0.180174	0.516060	No
3 Year	0.048349	-0.270637	-0.318986	1.391810	No
5 Year	0.101726	-0.023477	-0.125203	-0.631309	No
10 year	0.063741	0.101946	0.038205	0.536702	No
12 years	0.124309	0.136268	0.011959	0.278210	No
15 years	0.083417	0.095349	0.011932	0.405308	No

Table 3 shows the mean annual returns and mean standard deviations of Egypt and compares them to that of the S&P500, MSCI and FTSE emerging markets. The mean returns over the 6 periods analysed range from -27% to 47%. The standard deviations of Egypt range from 6% to 10%. Results of the f tests show the standard deviations of Egypt and the international indices were significantly different with exception of Egypt with the MSCI and FTSE emerging markets over 1 and 3 years. The t tests presented show that for the overall periods analysed, mean monthly returns of Egypt are not significantly higher or lower than international counterparts, again leading us to conclude that Egypt as with Botswana has returns similar to that of other world developed and emerging markets.

Table 4 – Ivory Coast performance compared to international indices

Panel A

	S&P 500 standard deviation	Ivory Coast standard deviation	Difference	F-Value	P value	Significance
1 year	0.038791	0.024652	-0.014138	0.403889	0.065099	No
3 Year	0.047552	0.049868	0.002317	1.099811	0.388440	No
5 Year	0.047770	0.043839	-0.003930	0.842221	0.254027	No
10 year	0.044466	0.061291	0.016826	1.899967	0.000252	Yes
12 year	0.045691	0.060472	0.014781	1.751675	0.000425	Yes
15 year	0.044131	0.056196	0.012065	1.621496	0.000656	Yes

Panel B

	MSCI emerging markets standard deviation	Ivory Coast standard deviation	Difference	F-Value	P value	Significance
1 year	0.064607	0.024652	-0.039955	0.145598	0.001097	Yes
3 Year	0.073250	0.049868	-0.023382	0.463479	0.011790	Yes
5 Year	0.066249	0.043839	-0.022410	0.437889	0.000840	Yes
10 year	0.069780	0.061291	-0.008488	0.771506	0.078400	No
12 year	0.069869	0.060472	-0.009397	0.749105	0.042060	Yes
15 year	0.068085	0.056196	-0.011889	0.681249	0.005290	Yes

Panel C

	FTSE emerging markets standard deviation	Ivory coast standard deviation	Difference	F-Value	P value	Significance
1 year	0.062560	0.024652	-0.037908	0.155280	0.001482	Yes
3 Year	0.072744	0.049868	-0.022876	0.469946	0.013074	Yes
5 Year	0.065839	0.043839	-0.021999	0.443372	0.000983	Yes
10 year	0.069409	0.061291	-0.008117	0.779776	0.087252	No
12 year	0.069733	0.060472	-0.009260	0.752045	0.044198	Yes
15 year	0.067900	0.056196	-0.011704	0.684976	0.005866	Yes

Panel D

	S&P 500 returns	Ivory Coast returns	Difference	T –Test	Significance
1 Years	0.101976	-0.010526	-0.112503	0.560640	No
3 Year	-0.036919	-0.067628	-0.030709	0.171200	No
5 Year	-0.022664	-0.029003	-0.006338	-0.059050	No
10 year	-0.040459	0.071773	0.112233	1.525162	No
12 years	0.001373	0.059927	0.058554	0.793309	No
15 years	0.023145	0.043911	0.020766	0.422944	No

Panel E	MSCI emerging markets returns	Ivory Coast returns	Difference	T –Test	Significance
1 Years	0.670068	-0.010526	-0.680594	2.272380	Yes
3 Year	0.037151	-0.067628	-0.104780	0.711960	No
5 Year	0.097906	-0.029003	-0.126908	-1.094050	No
10 year	0.057865	0.071773	0.013908	0.027642	No
12 years	0.117824	0.059927	-0.057898	-0.689200	No
15 years	0.080338	0.043911	-0.036426	-0.556930	No
Panel F	**FTSE emerging markets returns**	**Ivory coast returns**	**Difference**	**T –Test**	**Significance**
1 Years	0.652174	-0.010526	-0.662700	2.262420	Yes
3 Year	0.048349	-0.067628	-0.115978	0.785130	No
5 Year	0.101726	-0.029003	-0.130729	-1.143252	No
10 year	0.063741	0.071773	0.008032	-0.024300	No
12 years	0.124309	0.059927	-0.064383	-0.765937	No
15 years	0.083417	0.043911	-0.039505	-0.595307	No

The annualized mean dollar returns of Ivory Coast range from -6% to 7% while the standard deviations range from 2% to 6%. F tests carried out show that the standard deviations were insignificant for a few years in exception of S&P 500 over 10, 12 and 15 years, the MSCI over the 1, 3, 5, 10, 12 and 15 year period and the FTSE emerging market standard deviation over the 1, 3, 5, 12 and 15 year period. The t test run on the returns were insignificantly different for all but the MSCI and FTSE 1 year period. Again this shows a case that the returns on Ivory Coast are not significantly different from that of world emerging and developed markets.

Table 5 Kenya performance compared to international indices

Panel A

	S&P500 standard deviation	Kenya standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.037669	-0.001122	0.942991	0.460344	No
3 Year	0.047552	0.034563	-0.012988	0.528324	0.029699	Yes
5 Year	0.047770	0.065768	0.017998	1.895515	0.007223	Yes
10 year	0.044466	0.072305	0.027839	2.644110	0.000000	Yes
12 year	0.045691	0.070484	0.024793	2.379662	0.000000	Yes
15 year	0.044131	0.067495	0.023364	2.339117	0.000000	Yes

Panel B

	MSCI emerging markets standard deviation	Kenya standard deviation	Difference	F-Value	P Value	Significance
1 year	0.064607	0.037669	-0.026938	0.339939	0.036762	Yes
3 Year	0.073250	0.034563	-0.038687	0.222645	0.000009	Yes
5 Year	0.066249	0.065768	-0.000481	0.985520	0.477569	No
10 year	0.069780	0.072305	0.002525	1.073675	0.348819	No
12 year	0.069869	0.070484	0.000614	1.017664	0.458238	No
15 year	0.068085	0.067495	-0.000590	0.982747	0.453725	No

Panel C

	FTSE emerging markets standard deviation	Kenya standard deviation	Difference	F-Value	P Value	Significance
1 year	0.062560	0.037669	-0.024892	0.362546	0.045803	Yes
3 Year	0.072744	0.034563	-0.038181	0.225751	0.000011	Yes
5 Year	0.065839	0.065768	-0.000070	0.997860	0.496703	No
10 year	0.069409	0.072305	0.002896	1.085185	0.327521	No
12 year	0.069733	0.070484	0.000751	1.021659	0.448940	No
15 year	0.067900	0.067495	-0.000404	0.988124	0.468194	No

Panel D

	S&P500 returns	Kenya returns	Difference	T –Test	Significance
1 Years	0.101976	-0.333333	-0.435310	2.581960	Yes
3 Year	-0.036919	-0.292485	-0.255565	2.591650	Yes
5 Year	-0.022664	-0.031034	-0.008370	0.003227	No
10 year	-0.040459	-0.015639	0.024820	0.308038	No
12 years	0.001373	0.011409	0.010036	0.217089	No
15 years	0.023145	0.010330	-0.012816	0.039534	No

Panel E

	MSCI emerging markets returns	Kenya returns	Difference	T –Test	Significance
1 Years	0.670068	-0.333333	-1.003401	3.624170	Yes
3 Year	0.037151	-0.292485	-0.329636	2.514286	Yes
5 Year	0.097906	-0.031034	-0.128940	-0.887200	No
10 year	0.057865	-0.015639	-0.073504	-0.863550	No
12 years	0.117824	0.011409	-0.106415	-1.063800	No
15 years	0.080338	0.010330	-0.070008	-0.794810	No

Panel F

	FTSE emerging markets returns	Kenya returns	Difference	T –Test	Significance
1 Years	0.652174	-0.333333	-0.985507	3.642160	Yes
3 Year	0.048349	-0.292485	-0.340834	2.605000	Yes
5 Year	0.101726	-0.031034	-0.132761	-0.927776	No
10 year	0.063741	-0.015639	-0.079381	-0.913828	No
12 years	0.124309	0.011409	-0.112900	-1.135555	No
15 years	0.083417	0.010330	-0.073087	-0.830402	No

The annualised Kenya mean returns ranged from -33% to 1% over the period analysed. The standard deviations range from 3% to 7%. Kenya had mostly significant differentials for the standard deviation with the S&P500, in exception for the 1 year period, insignificant differentials between Kenya and the MSCI for years 5, 10, 12 and 15 and insignificant differentials with the FTSE emerging markets standard deviation for years 5, 10, 12 and 15. The mean returns were significantly different for years 1 and 3 again proving a case that another African stock, Kenya is not significantly different for world developed and emerging markets.

Table 6 Mauritius performance compared to international indices

Panel A	S&P 500 standard deviation	Mauritius standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.036036	-0.002755	0.862996	0.401355	No
3 Year	0.047552	0.030958	-0.016594	0.423843	0.005869	Yes
5 Year	0.047770	0.041747	-0.006023	0.763732	0.149631	No
10 year	0.044466	0.054322	0.009856	1.492448	0.014578	Yes
12 year	0.045691	0.059300	0.013609	1.684418	0.000949	Yes
15 year	0.044131	0.054943	0.010812	1.550019	0.001772	Yes

Panel B	MSCI emerging markets standard deviation	Mauritius standard deviation	Difference	F-Value	P Value	Significance
1 year	0.064607	0.036036	-0.028572	0.311101	0.026831	Yes
3 Year	0.073250	0.030958	-0.042293	0.178615	0.000001	Yes
5 Year	0.066249	0.041747	-0.024503	0.397081	0.000231	Yes
10 year	0.069780	0.054322	-0.015458	0.606028	0.003231	Yes
12 year	0.069869	0.059300	-0.010569	0.720342	0.024975	Yes
15 year	0.068085	0.054943	-0.013142	0.651219	0.002156	Yes

Panel C	FTSE emerging markets standard deviation	Mauritius standard deviation	Difference	F-Value	P value	Significance
1 year	0.062560	0.036036	-0.026525	0.331791	0.033773	Yes
3 Year	0.072744	0.030958	-0.041787	0.181107	0.000001	Yes
5 Year	0.065839	0.041747	-0.024092	0.402053	0.000274	Yes
10 year	0.069409	0.054322	-0.015087	0.612524	0.003838	Yes
12 year	0.069733	0.059300	-0.010432	0.723170	0.026368	Yes
15 year	0.067900	0.054943	-0.012956	0.654781	0.002414	Yes

Panel D	S&P 500 returns	Mauritius returns	Difference	T -Test	Significance
1 Years	0.101976	-0.055556	-0.157532	0.860500	No
3 Year	-0.036919	-0.126420	-0.089500	0.808130	No
5 Year	-0.022664	0.050246	0.072910	0.668292	No
10 year	-0.040459	0.068758	0.109218	1.287680	No
12 years	0.001373	0.119830	0.118457	1.544139	No
15 years	0.023145	0.093717	0.070572	1.148716	No

Panel E	MSCI emerging markets returns	Mauritius returns	Difference	T -Test	Significance
1 Years	0.670068	-0.055556	-0.725624	2.392500	Yes
3 Year	0.037151	-0.126420	-0.163571	1.221610	No
5 Year	0.097906	0.050246	-0.047660	-0.519590	No
10 year	0.057865	0.068758	0.010893	-0.254720	No
12 years	0.117824	0.119830	0.002006	-0.089660	No
15 years	0.080338	0.093717	0.013380	0.017894	No

Panel F	FTSE emerging markets returns	Mauritius returns	Difference	T -Test	Significance
1 Years	0.652174	-0.055556	-0.707729	2.381310	Yes
3 Year	0.048349	-0.126420	-0.174769	1.306680	No
5 Year	0.101726	0.050246	-0.051480	-0.567024	No
10 year	0.063741	0.068758	0.005017	-0.310217	No
12 years	0.124309	0.119830	-0.004479	-0.166364	No
15 years	0.083417	0.093717	0.010301	-0.019890	No

The annualised mean returns of Mauritius range from -12% to 11% while the standard deviations range from 3% to 5%. The annualised returns of Morocco range from -20% to 7% and the standard deviations range from 3% to 5%. The F test results show that the standard deviations are significantly different for the periods analysed in exception for the S&P 500 over the 1 and 5 year period. The t-test results indicate that the mean monthly returns of Mauritius are insignificantly different for all other than he MSCI and FTSE emerging market indices over the 1-year period.

Table 7 Morocco performance compared to international indices

Panel A	S&P 500 standard deviation	Morocco standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.036305	-0.002485	0.875959	0.411153	No
3 Year	0.047552	0.047047	-0.000505	0.978879	0.474645	No
5 Year	0.047770	0.048904	0.001135	1.048078	0.428143	No
10 year	0.044466	0.056908	0.012442	1.637896	0.003643	Yes
12 year	0.045691	0.054674	0.008983	1.431861	0.016001	Yes
15 year	0.044131	0.051506	0.007375	1.362152	0.019673	Yes

Panel B	MSCI emerging markets standard deviation	Morocco standard deviation	Difference	F-Value	P Value	Significance
1 year	0.064607	0.036305	-0.028302	0.315774	0.028317	Yes
3 Year	0.073250	0.047047	-0.026203	0.412516	0.004701	Yes
5 Year	0.066249	0.048904	-0.017345	0.544919	0.010062	Yes
10 year	0.069780	0.056908	-0.012872	0.665089	0.013158	Yes
12 year	0.069869	0.054674	-0.015195	0.612336	0.001732	Yes
15 year	0.068085	0.051506	-0.016579	0.572289	0.000106	Yes

Panel C	FTSE emerging markets standard deviation	Morocco standard deviation	Difference	F-Value	P Value	Significance
1 year	0.062560	0.036305	-0.026255	0.336774	0.035584	Yes
3 Year	0.072744	0.047047	-0.025698	0.418272	0.005270	Yes
5 Year	0.065839	0.048904	-0.016934	0.551742	0.011390	Yes
10 year	0.069409	0.056908	-0.012501	0.672218	0.015239	Yes
12 year	0.069733	0.054674	-0.015059	0.614740	0.001865	Yes
15 year	0.067900	0.051506	-0.016393	0.575420	0.000122	Yes

Panel D	S&P 500 returns	Morocco returns	Difference	T -Test	Significance
1 Years	0.101976	-0.179359	-0.281336	1.764300	No
3 Year	-0.036919	-0.200504	-0.163585	1.311140	No
5 Year	-0.022664	-0.038097	-0.015432	-0.064030	No
10 year	-0.040459	0.058297	0.098756	1.555933	No
12 years	0.001373	0.070244	0.068871	0.995649	No
15 years	0.023145	0.032651	0.009506	0.216612	No
Panel E	**MSCI emerging markets returns**	**Morocco returns**	**Difference**	**T -Test**	**Significance**
1 Years	0.670068	-0.179359	-0.849427	3.038340	Yes
3 Year	0.037151	-0.200504	-0.237656	1.596620	No
5 Year	0.097906	-0.038097	-0.136003	-1.062130	No
10 year	0.057865	0.058297	0.000432	-0.006130	No
12 years	0.117824	0.070244	-0.047580	-0.595930	No
15 years	0.080338	0.032651	-0.047686	-0.757800	No
Panel F	**FTSE emerging markets returns**	**Morocco returns**	**Difference**	**T -Test**	**Significance**
1 Years	0.652174	-0.179359	-0.831533	3.042930	Yes
3 Year	0.048349	-0.200504	-0.248854	1.675520	No
5 Year	0.101726	-0.038097	-0.139823	-1.109296	No
10 year	0.063741	0.058297	-0.005445	-0.059817	No
12 years	0.124309	0.070244	-0.054065	-0.675786	No
15 years	0.083417	0.032651	-0.050766	-0.797867	No

The annualised mean dollar returns of Morocco range from -20% to 7% and the standard deviations range from 3% to 5%. The f tests show the standard deviations are significantly different for most periods in exception to Morocco and the S&P 500 over the 1, 3 and 5 year period. The mean returns are significantly different with the MSCI and FTSE emerging markets over the 1 year period.

Table 8 Nigeria performance compared to international indices

Panel A

	S&P 500 standard deviation	Nigeria standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.091862	0.053071	5.608088	0.002783	Yes
3 Year	0.047552	0.078246	0.030694	2.707659	0.001808	Yes
5 Year	0.047770	0.073597	0.025828	2.373681	0.000511	Yes
10 year	0.044466	0.081616	0.037150	3.368985	0.000000	Yes
12 year	0.045691	0.090613	0.044922	3.932976	0.000000	Yes
15 year	0.044131	0.085433	0.041302	3.747627	0.000000	Yes

Panel B

	MSCI emerging markets standard deviation	Nigeria standard deviation	Difference	F-Value	P Value	Significance
1 year	0.064607	0.091862	0.027254	2.021659	0.118528	No
3 Year	0.073250	0.078246	0.004996	1.141053	0.347169	No
5 Year	0.066249	0.073597	0.007348	2.373681	0.000511	Yes
10 year	0.069780	0.081616	0.011836	1.368020	0.043696	Yes
12 year	0.069869	0.090613	0.020744	1.681939	0.000977	Yes
15 year	0.068085	0.085433	0.017348	1.574513	0.001266	Yes

Panel C

	FTSE emerging markets standard deviation	Nigeria standard deviation	Difference	F-Value	P Value	Significance
1 year	0.062560	0.091862	0.029301	2.156106	0.098846	No
3 Year	0.072744	0.078246	0.005501	1.156974	0.332070	No
5 Year	0.065839	0.073597	0.007759	1.249581	0.195318	No
10 year	0.069409	0.081616	0.012207	1.382685	0.038595	Yes
12 year	0.069733	0.090613	0.020881	1.688542	0.000904	Yes
15 year	0.067900	0.085433	0.017533	1.583127	0.001123	Yes

Panel D

	S&P 500 returns	Nigeria returns	Difference	T –Test	Significance
1 Years	0.101976	0.000000	-0.101976	1.043755	No
3 Year	-0.036919	0.170447	0.207366	1.043755	No
5 Year	-0.022664	0.232569	0.255233	1.965847	No
10 year	-0.040459	0.104001	0.144461	1.813064	No
12 years	0.001373	0.096917	0.095544	1.214208	No
15 years	0.023145	0.102303	0.079157	1.252879	No

Panel E					
	MSCI emerging markets returns	**Nigeria returns**	**Difference**	**T –Test**	**Significance**
1 Years	0.670068	0.000000	-0.670068	1.244930	No
3 Year	0.037151	0.170447	0.133295	0.413060	No
5 Year	0.097906	0.232569	0.134663	0.869729	No
10 year	0.057865	0.104001	0.046137	0.517698	No
12 years	0.117824	0.096917	-0.020907	-0.005190	No
15 years	0.080338	0.102303	0.021965	0.376103	No
Panel F					
	FTSE emerging markets returns	**Nigeria returns**	**Difference**	**T –Test**	**Significance**
1 Years	0.652174	0.000000	-0.652174	1.213700	No
3 Year	0.048349	0.170447	0.122097	0.356796	No
5 Year	0.101726	0.232569	0.130842	0.902840	No
10 year	0.063741	0.104001	0.040260	0.473959	No
12 years	0.124309	0.096917	-0.027392	-0.665150	No
15 years	0.083417	0.102303	0.018886	0.346235	No

The annualised dollar returns of Nigeria range from 0% to 23% and the standard deviations from 7% to 9%. Nigeria experienced mean standard deviations of between 7% and 9%. Tests for significance between standard deviations of Nigeria and the international indices were insignificant for only the MSCI 1 and 3 year period and FTSE for the 1, 3 and 5 year period. The mean returns were insignificantly different for all periods.

Table 9 South Africa performance compared to international indices

Panel A	S&P 500 standard deviation	South Africa standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.082813	0.044023	4.557697	0.006834	Yes
3 Year	0.047552	0.076251	0.028699	2.571343	0.002853	Yes
5 Year	0.047770	0.069817	0.022047	2.136081	0.001906	Yes
10 year	0.044466	0.075623	0.031157	2.892372	0.000000	Yes
12 year	0.045691	0.076812	0.031121	2.826156	0.000000	Yes
15 year	0.044131	0.073718	0.029587	2.790301	0.000000	Yes
Panel B	**MSCI emerging markets standard deviation**	**South Africa standard deviation**	**Difference**	**F-Value**	**P Value**	**Significance**
1 year	0.064607	0.082813	0.018206	1.643003	0.200981	No
3 Year	0.073250	0.076251	0.003001	1.083607	0.405480	No
5 Year	0.066249	0.069817	0.003567	1.110595	0.342930	No
10 year	0.069780	0.075623	0.005843	1.174485	0.189810	No
12 year	0.069869	0.076812	0.006943	1.208607	0.128399	No
15 year	0.068085	0.073718	0.005633	1.172306	0.144251	No
Panel C	**FTSE emerging markets standard deviation**	**South Africa standard deviation**	**Difference**	**F-Value**	**P Value**	**Significance**
1 year	0.062560	0.082813	0.020253	1.752269	0.172196	No
3 Year	0.072744	0.076251	0.003506	1.098726	0.389566	No
5 Year	0.065839	0.069817	0.003978	1.124501	0.325478	No
10 year	0.069409	0.075623	0.006214	1.187075	0.174437	No
12 year	0.069733	0.076812	0.007079	1.213352	0.123553	No
15 year	0.067900	0.073718	0.005818	1.178720	0.136145	No

Panel D

	S&P 500 returns	South Africa returns	Difference	T -Test	Significance
1 Years	0.101976	0.499377	0.397401	0.895828	No
3 Year	-0.036919	0.030211	0.067131	1.043755	No
5 Year	-0.022664	0.124684	0.147348	1.233065	No
10 year	-0.040459	0.083583	0.124042	1.573296	No
12 years	0.001373	0.141274	0.139902	1.758242	No
15 years	0.023145	0.106192	0.083047	1.298465	No

Panel E

	MSCI emerging markets returns	South Africa returns	Difference	T -Test	Significance
1 Years	0.670068	0.499377	-0.170691	1.244693	No
3 Year	0.037151	0.030211	-0.006940	0.413060	No
5 Year	0.097906	0.124684	0.026778	0.220553	No
10 year	0.057865	0.083583	0.025718	0.243924	No
12 years	0.117824	0.141274	0.023450	0.320979	No
15 years	0.080338	0.106192	0.025855	0.320625	No

Panel F

	FTSE emerging markets returns	South Africa returns	Difference	T -Test	Significance
1 Years	0.652174	0.499377	-0.152797	1.213700	No
3 Year	0.048349	0.030211	-0.018138	0.356796	No
5 Year	0.101726	0.124684	0.022957	0.184549	No
10 year	0.063741	0.083583	0.019842	0.197598	No
12 years	0.124309	0.141274	0.016965	0.253675	No
15 years	0.083417	0.106192	0.022775	0.288072	No

The mean annualised returns of South Africa range from 3% to 49% and the standard deviations range from 6% to 8%. South African mean standard deviations were not significantly different with the MSCI and FTSE emerging markets for years 1, 3, 5, 10, 12 and 15 years. This is due to the fact that South Africa is part of the MSCI and FTSE emerging market indices. The f tests run on South African and S & P 500 standard deviations showed that the differences were mainly significant. The mean returns of South Africa were not statistically significantly less than or more than the S&P500 and the MSCI and FTSE emerging markets.

Table 10 Zambia performance compared to international indices

Panel A

	S&P 500 standard deviation	Zambia standard deviation	Difference	F-Value	P Value	Significance
1 year	0.038791	0.072721	0.033931	3.514550	0.019272	yes
3 Year	0.047552	0.087310	0.039758	3.371300	0.000217	yes
5 Year	0.047770	0.075320	0.027551	2.486117	0.000275	yes
10 year	0.044466	0.117233	0.072767	6.951017	0.000000	yes
12 year	0.045691	0.110925	0.065234	5.893867	0.000000	yes
15 year	0.044131	0.100985	0.056854	5.236218	0.000000	yes

Panel B

	MSCI emerging markets standard deviation	Zambia standard deviation	Difference	F-Value	P Value	Significance
1 year	0.064607	0.072721	0.008114	1.266959	0.344232	no
3 Year	0.073250	0.087310	0.014060	1.420722	0.148345	no
5 Year	0.066249	0.075320	0.009071	1.292587	0.161453	no
10 year	0.069780	0.117233	0.047453	2.822551	0.000000	Yes
12 year	0.069869	0.110925	0.041056	2.520515	0.000000	Yes
15 year	0.068085	0.100985	0.032900	2.199924	0.000000	Yes

Panel C

	FTSE emerging markets standard deviation	Zambia standard deviation	Difference	F-Value	P Value	Significance
1 year	0.062560	0.072721	0.010161	1.351216	0.305137	No
3 Year	0.072744	0.087310	0.014565	1.440545	0.139069	No
5 Year	0.065839	0.075320	0.009482	1.308771	0.150033	No
10 year	0.069409	0.117233	0.047824	2.852808	0.000000	Yes
12 year	0.069733	0.110925	0.041193	2.530410	0.000000	Yes
15 year	0.067900	0.100985	0.033085	2.211960	0.000000	Yes

Panel D

	S&P 500 returns	Zambia returns	Difference	T –Test	Significance
1 Years	0.101976	0.027778	-0.074199	1.931570	No
3 Year	-0.036919	0.013700	0.050620	0.401130	No
5 Year	-0.022664	0.050246	0.072910	0.619476	No
10 year	-0.040459	0.205587	0.246046	2.106561	Yes
12 years	0.001373	0.209118	0.207745	2.061290	Yes
15 years	0.023145	0.188985	0.165839	1.961008	No

Panel E	MSCI emerging markets returns	Zambia returns	Difference	T –Test	Significance
1 Years	0.670068	0.027778	-0.642290	1.956920	Yes
3 Year	0.037151	0.013700	-0.023451	-0.154600	No
5 Year	0.097906	0.050246	-0.047660	-0.277460	No
10 year	0.057865	0.205587	0.147722	1.108307	No
12 years	0.117824	0.209118	0.091293	0.941863	No
15 years	0.080338	0.188985	0.108647	1.122635	No
Panel F	**FTSE emerging markets returns**	**Zambia returns**	**Difference**	**T –Test**	**Significance**
1 Years	0.652174	0.027778	-0.624396	0.714980	No
3 Year	0.048349	0.013700	-0.034649	-0.100414	No
5 Year	0.101726	0.050246	-0.051480	-0.313370	No
10 year	0.063741	0.205587	0.141845	1.074495	No
12 years	0.124309	0.209118	0.084808	0.888870	No
15 years	0.083417	0.188985	0.105568	1.096448	No

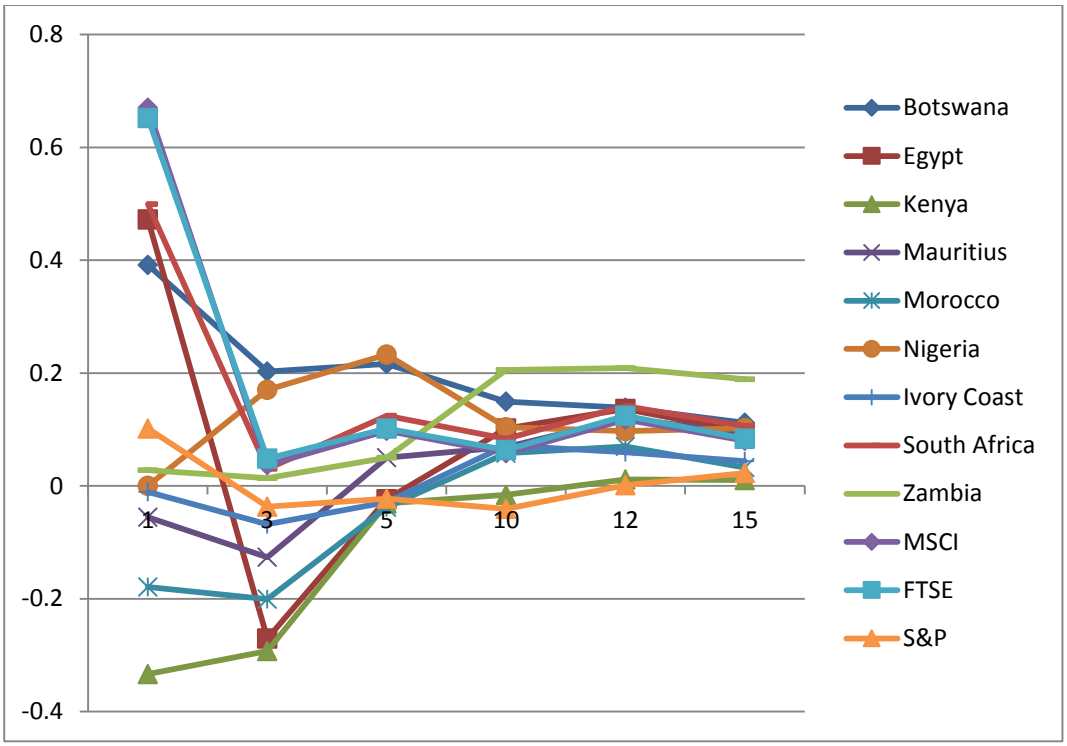
The mean annualised returns of Zambia range from 1% to 20% and the standard deviations range between 7% and 11%. The F tests run show that standard deviations and thus risk was for the majority of the period significant with exception of Zambia with MSCI and FTSE emerging markets over the 1, 3 and 5 year period. The mean annualised returns tested significant for none but the S & P 500 over the 10 and 12 year period, and the MSCI emerging market over the 1 year period.

The S&P 500 annualised dollar returns range from -4.05% and 10.2% and the standard deviations over 3% and 4%. The MSCI emerging market returns range from 3% to 67% and the standard deviations over 6% and 7%. The FTSE emerging market returns range from 4% to 65% and the standard deviations over 6% to 7%. Higher average returns tend to be associated with higher levels of risk. As is to be expected, the returns of the African emerging and frontier markets over the periods analysed are higher than that of the S&P 500 and in some years, the MSCI and FTSE emerging market indices over periods of time. The returns on the African emerging markets tend to be wide in dispersion ranging from -33% in Kenya to a 47% in Egypt. The S&P500 tends to show more stability at a low of -4% and a high of 10%, while the MSCI and

FTSE emerging market indices range from 3% to 67% and 4% to 25% respectively. The T tests carried out to establish whether the mean returns between the 9 countries analysed were significantly different from that of the 3 developed and emerging market indices showed that for most African emerging and frontier markets, the differences were insignificant over the periods analysed. This could lead us to conclude that the returns of some of the emerging and frontier markets analysed over certain periods were neither significantly higher nor lower than returns in emerging and developed markets and thus could also be invested in by an international investor. A one sided Anova test was run. A one-way Anova test is used to test for the difference among two or more independent groups/means. At a 5% significance level, the F statistic is 0.7782. The p value of 0.6624. The high p-value makes us fail to reject the null hypothesis and a conclusion cannot be reached about the difference between the average rates of returns for the country indices. This thus shows the returns received from the investments in the various markets are not significantly different from one another and thus an investment in African exchanges would yield similar returns received in the emerging and developing markets. It can thus be argued that the results produced indicate that the world developed and emerging markets are on par with African markets.

Figure 1 shows the growth over the 1, 3, 5, 10, 12 and 15 years of the individual market indices being analysed. The analysis shows that the returns peak at the first year with the exception of Kenya, Morocco and Mauritius. Over time the returns gradually drop and eventually stabilize after three years. Kenya, Morocco and Mauritius initially start with the lowest returns, gradually increase, and eventually start to stabilize after twelve years.

Figure 1



4.4 Analysis of Correlations

Table 11 shows the results of the correlation matrix. The correlation between Botswana and South Africa was the highest for Botswana and the group of countries analysed. This is understandable as Botswana has close ties with South Africa and most of the companies listed on the Botswana stock exchange are listed on the South African stock exchange as well. The correlation between Botswana and other emerging and frontier African markets such as Kenya, Mauritius, Morocco, Nigeria and Zambia were relatively low. Botswana and Ivory Coast were the only countries to have negative correlation to one another.

Table 11 Correlation between different indices

	Botswana	*Egypt*	*Ivory Coast*	*Kenya*	*Mauritius*	*Morocco*	*Nigeria*	*South Africa*	*Zambia*	*MSCI EM*	*FTSE EM*	*S&P500*
Botswana	1.000											
Egypt	0.023	1.000										
Ivory Coast	-0.028	0.046	1.000									
Kenya	0.020	0.175	0.171	1.000								
Mauritius	0.228	0.212	0.053	0.515	1.000							
Morocco	0.188	0.252	0.193	0.230	0.311	1.000						
Nigeria	0.150	0.170	0.148	0.247	0.344	0.249	1.000					
South Africa	0.248	0.176	0.118	0.358	0.340	0.333	0.268	1.000				
Zambia	0.155	0.070	0.255	0.239	0.274	0.095	0.112	0.187	1.000			
MSCI EM	0.183	0.258	0.145	0.347	0.429	0.314	0.275	0.859	0.191	1.000		
FTSE EM	0.199	0.252	0.147	0.335	0.421	0.325	0.272	0.859	0.198	0.995	1.000	
S&P500	0.130	0.178	0.150	0.362	0.337	0.233	0.260	0.696	0.152	0.770	0.763	1.000

The correlation between Botswana and the developed proxy (S & P 500), the FTSE emerging market and MSCI emerging market was low. This shows the diversification effect an international investor can gain from investing in the Botswana stock exchange. Although small, the Botswana stock exchange is very liquid and thus an investor does not have to worry about the inability to get rid of the shares in their portfolio when the need arises. The results of the correlation matrix shows that Egypt, which is Africa's second biggest stock exchange, had a highest correlation with Mauritius, Morocco, the FTSE and MSCI emerging market indices. The other African emerging markets, South Africa and Nigeria, and the S&P 500 have relatively lower correlation with Egypt. Ivory Coast has the least correlation with Mauritius and South Africa. Returns on the Kenya stock exchange are relatively low with all indices in the set but highest with Mauritius. Mauritius had the most intra Africa market correlation but the lowest with Ivory Coast. Third oldest exchange on the continent, *The Casablanca Stock Exchange* is said to achieve the best returns in the Middles East and North Africa (MENA) region. It is the third largest exchange on the African continent after the JSE and NSE. Correlation between the Nigerian stock market returns and that of South Africa was relatively stable as is the case with the emerging market indices and the S&P500. South Africa being the 14th largest stock market in the world is seen as an emerging market and receives the bulk of investment targeted

to the African region. The results of this analysis prove that with a correlation of 0.6962 with the S&P 500, South Africa is not the best African candidate for diversification of an international investor's portfolio. Zambia has lowest correlation with Egypt, Morocco and Nigeria. One of the cruxes of this paper is in the analysis of the diversification effect of an international investor investing in Africa. The analysis of the correlation co-efficient of the African emerging and frontier markets and the 2 emerging market indices and the developed market index. The MSCI, FTSE emerging market indices and the S&P 500 index are the highest correlated with South Africa. This thus shows that the diversification effect of investing in South Africa is not as high as if investors were to invest in the other African countries looked at. Most especially Ivory Coast, Botswana, Egypt, Nigeria and Zambia. The emerging market indices are highly correlated to the S&P 500.

4.5 Chapter summary

The primary objective of this paper is to establish the performance of African emerging and frontier markets. This is done through the investigation of the risk and reward trade off in these markets. This section of the paper sought to provide detailed analysis of the returns calculated for the various countries being analysed over the period from January 1999 to January 2014. The study started by discussing and analysing the returns. We looked at the various descriptive statistics.

Chapter 5 Discussion and conclusion

5.1 Introduction

This study sought to bridge the gap left in the analysis of African frontier and emerging markets by providing an initial investigation of the emerging and frontier equity markets of Africa, through looking at the performance of stock market indices. In the attainment of the objectives of the study, the paper is structured as follows; Chapter 2 presented and provided a theoretical understanding and a literature review of current work done on frontier markets and emerging markets. Chapter 3 covered the methodology and data employed in this study. Chapter 4 presented the test results and provides answers to the research questions posed. This section presents the discussion, conclusion and suggests further work that can be done.

5.2 Discussion

There has been a huge increase in the interest shown by academics, investors, policy makers and others, in frontier and emerging markets. Africa, outside of South Africa, tends to be ignored as an investment destination by many international investors without them having looked at the investment potential of Africa's markets. The interest in frontier markets is slowly increasing due to the fact that these markets now have the diversification and risk reward benefit previously shown by investing in emerging markets. As the world has become more integrated, the benefits of investing in traditional emerging markets have decreased.

The purpose of the paper was to show the effects of investments made in African emerging and frontier markets. The questions addressed were whether African emerging and frontier equities provide a diversification effect to an investor. Whether African emerging and frontier markets offer significantly higher returns when compared to other emerging markets and developed markets. What the risk associated with investing in African emerging and frontier markets? What the risk return trade off in African emerging and frontier markets were.

The analysis looked at nine African country index prices and compared them to that of the S&P500, the MSCI and FTSE emerging market indices.

The aim of this paper is to compare the performance of the African emerging and frontier indices to the S&P 500, the MSCI and FTSE emerging market indices. The results of this analysis shows that African emerging and frontier market shares can be included in an international portfolio to achieve the diversification effect sought out by many investors and that the returns to be expected are higher than that of traditional emerging and developed markets.

The results indicate that the African emerging and frontier markets over the sub-periods of 1, 3, 5, 10, 12 and 15 years on average provided higher returns than the developed market index. Although statistically speaking, the returns in the African emerging and frontier markets were insignifiicanly different from that of world emerging and developed markets. Some countries such as Egypt tended to be highly volatile in with a negative return over the 3 year and 5 year holding period and a high of 47% over a holding period of 1 year, Ivory Coast with a negative, Kenya, Mauritius, Morocco and Nigeria that experienced negative and zero returns over some of the periods analysed. The returns were further analysed using excel by applying the Anova and t tests. The test result stated that at a 95% confidence level, we cannot reject the null hypothesis that there is a difference in the mean returns of the emerging and frontier African returns and the international emerging market and developed market indices. This led to the conclusion that African emerging markets tend to yield similar returns to those of international and developed markets. From the analysis, we are able to show that the returns of the 8 African countries included in the analysis were on average higher than that of the S&P 500 and emerging market indices. On analysis of the results, the study shows that there was a significant difference in standard deviations and thus risk between the world emerging and developed indices and Botswana, Egypt, Ivory Coast, Kenya (to some extent), Mauritus, Morocco, Nigeria and South Africa (with the S&P only). In the light of this and the studies by du Toit et al (2010) and Krohne and Speidell (2007), one can argue that frontier markets, with lower risk and low correlation with developed and world emerging markets, there is a strong possibility that investing in these shares could improve the risk and return of an equity portfolio.

5.3 Conclusion and further work

We are able to conclude as with selected research on emerging investments that African emerging and frontier market investments are an important asset class in the portfolio of developed and foreign emerging market investors. We found that African emerging and frontier market equities provide a diversification effect to an investor. We found that although the majority of the mean returns of the African emerging and frontier markets are not significantly higher than their counterparts over the periods analysed, the returns on average tend to be higher in these markets. The returns and standard deviations found within African emerging and frontier markets are similar to that found in the world emerging markets, thus leading us to conclude that African investments should not be shunned away from as they portray similar characteristics to that of foreign emerging markets. We also found that the risk associated with investing in African emerging and frontier markets tends to be higher which would be expected given the higher returns.

This analysis uses only the main market indices registered on the various exchanges. Further work could address this limitation by studying the actual companies registered on the various stock exchanges for more information. One characteristic of a stock return is that the variability of returns can be different at different times and thus results tend to differ depending on when the analysis is started and cut off. While the results clearly indicate that it would be advantageous for an international investor to invest in Africa for diversification purposes and to earn a higher rate of return, it should be stated that Africa continues to be plagued by a lack of infrastructure, political, economic and social risk. It is in the best interest of an investor to do a thorough research into the country and stocks they are investing in. The liquidity and size of the stock markets is another consideration an investor should explore, as African exchanges tend to be smaller and less liquid than that of traditional emerging and developed markets.

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